CARIBOO FOREST REGION RESEARCH SECTION

Extension Note

"Making Research Work for You"

Extension Note #37

March 2002

RESEARCH ISSUE GROUPS

Soil Conservation

Wildlife Habitat

Hydrology

Forest Health

Reforestation

Stand Tending

Ecosystem Inventory and Classification

Biodiversity

Silvicultural Systems

Guideline Verification

Extension

Mount Tom Adaptive Management Project Overview

Quesnel Highland Alternative Silvicultural Systems

BACKGROUND

Approximately 98 per cent of the world population of mountain caribou live in British Columbia. The Committee on the Status of Endangered Wildlife in Canada has designated mountain caribou as threatened and the British Columbia Conservation Data Centre has placed mountain caribou on the provincial Red List. The Cariboo Chilcotin Land-Use Plan has placed a high priority on the maintenance of mountain caribou.

Mountain caribou require large areas of old-growth forests in the Englemann Spruce-Subalpine Fir and Interior Cedar-Hemlock biogeoclimatic zones. In mountainous areas of southeastern and eastcentral British Columbia, where snowfall is heavy, caribou eat arboreal (tree-dwelling) lichens almost exclusively during the winter. Logging can have a drastic effect on available arboreal-lichen biomass. The Quesnel Highland Alternative silvicultural-systems project was established in 1990 to find ways of maintaining caribou habitat in managed high-elevation forests.

The project has developed in three stages:

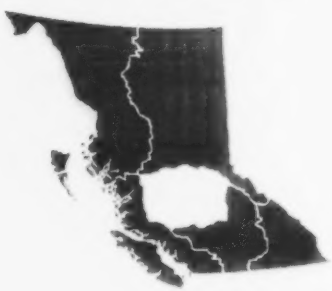
1) a pilot trial,
2) a replicated research trial, and
3) an adaptive management trial (Mount Tom).

The latter phases build on the knowledge of previous phases. Remeasurement of the replicated and pilot trials will continue, although at a lower intensity than in the past.

Mount Tom is a large trial that will be implemented operationally over a four-year period on approximately 1,200 hectares of high-elevation

QUESNEL HIGHLAND

Cariboo Forest Region, BC



Research Section, Ministry of Forests, Cariboo Forest Region

200 - 640 Borland Street, Williams Lake, BC V2G 4T1 Phone (250) 398-4345

Fax (250) 398-4380 http://www.for.gov.bc.ca/cariboo/research/research.htm

106-06847/

forest. The area is divided into nine cutblocks with six planned for harvesting by Weldwood of Canada Ltd. and three by West Fraser Mills Ltd. Group selection with a maximum of 33 per cent of the area harvested, including skid trails and in-block roads, will be the most common silvicultural system. Openings will range in size from 0.1-to 1.0-hectares, with the exception of several 3.0-hectare clearcuts. The use of strip selection with similar levels of removal remains an option on the steepest sites. Harvested strips would be 2-3 tree-lengths wide, while uncut strips would be twice this width. An 80-year cutting cycle is planned with both systems to ensure a stand condition that continuously meets caribou needs.

The goal of the Mount Tom adaptive-management project is to continue to develop and to test sustainable silvicultural systems that maintain caribou habitat while allowing for some timber harvesting. The project focus of the previous phases will shift from research to learning through the application of operational management activities.

Figure 1 is an overview map of the project showing all cutblocks and the habitat-control area. Figure 2 is an enlargement of one of the harvest blocks.

DETAILED OBJECTIVES OF THE PROJECT

Mountain Caribou

The replicated phase of the Quesnel-Highland study assessed the habitat response to logging and tree-regeneration response to this style of harvest. However, it could not assess caribou response directly because of the relatively small size of the treatment units and the low densities of caribou. This will be addressed at Mount Tom where approximately 1 200 hectares will be developed and a 2,000-hectare control will be left uncut until at least 2015.

Photo by Harold Armleder

CP 550-1 Showing the group selection harvesting pattern

The objective is:

- to assess the response of mountain caribou (using radio-telemetry) to operational forest development using group selection at the landscape scale.

Lichen Abundance

Group-selection systems with long cutting cycles may maintain suitable caribou habitat partially by retaining an adequate source of arboreal lichen, the primary winter food of caribou. The residual stand should contain suitable trees arranged in appropriate structures for supporting arboreal lichens and maintaining environmental conditions characteristic of old-growth forests

The objectives are:

- To compare the pre-harvest abundance of arboreal lichen between blocks and within blocks by ecotypes and harvesting treatments (forest / opening).
- To compare the pre-harvest abundance of arboreal lichen between the forested portions of harvested blocks and the paired controls.
- To compare the post-harvest abundance of arboreal lichen at 2- to 3-year intervals to pre-harvest levels in the forested portions of the blocks and the controls, and between the forested portions and the controls within each year.

Timber Harvesting

The harvesting done in the previous two phases of this project involved careful experimental harvesting on small areas to ensure that treatments were applied as designed. In contrast, all harvesting at Mount Tom will be done operationally.

The objectives are:

- To identify and resolve operational issues.
- To explore harvesting efficiencies using various types of logging equipment.

FIGURE 1 - Mount Tom Adaptive Management Area Overview Map

ROAD

3.2 KM

CP 554-2

MT. TOM ROAD

BRIDGE

CP 550-1

CONTROL AREA

CP 551-1

CP 572-2

CP 554-1

CP 553-1

CP 552-1

240

KETCHUM BIG VALLEY FSR

CP 572-4

2200 ROAD

MT WILEY

STEPHEN GULCH

CP 572-3

CONTROL

HARDSCRABBLE MTN

CARIBOU HABITAT CONTROL AREA

MT TOM

LEGEND

Definite Rivers / Creeks	Partially Cut Blocks
Indefinite Creeks	Adjacent Clear-Cut Blocks
Major Gravel Roads	Caribou Habitat Control
Single Lane Gravel Roads	Control Area
Trails	Lakes
100m Contours	Undeveloped Area
20m Contours	Caribou Line

0m 500m 1000m 1500m 2000m 2500m

Mapping By: PARAGON

MT. TOM ROAD

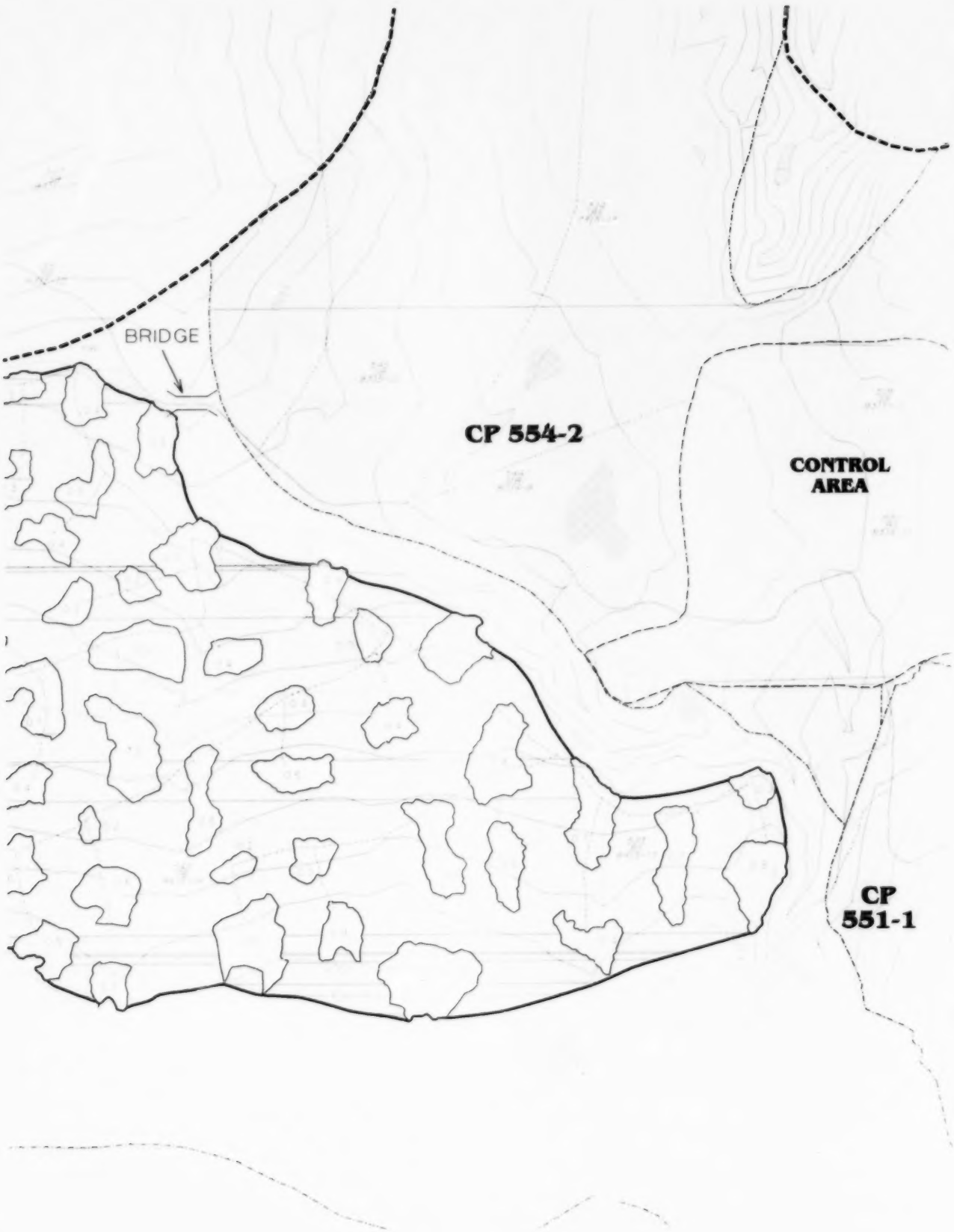
Figure 2
CP 550-1 Block Map

0m 125m 250m 500m

CP 554-1

Legend

Definite Rivers / Creeks	Block Boundary (Forested Area)
Indefinite Creeks	Cut Patches Within Block
Major Gravel Roads	Control Area
Single Lane Gravel Roads	Adjacent Blocks
Trails	Lakes
100m Contours	Caribou Line
20m Contours	Harvested Area (In Hectares)


BRIDGE
CP 554-2
CONTROL AREA
CP 551-1

Windthrow

Windfirm treatments are essential if viable silvicultural systems are to be developed. On the previous trial, windthrow was minimal. However, at Mount Tom, there will be a variety of opening shapes and sizes over a large area. Windthrow should be monitored for any trends related to block design.

The objectives are:

- To compare rates of windthrow in the forested portions of the harvested blocks, the 10 m forested edges around openings, and the unlogged control blocks, at regular intervals post-harvest.
- To compare rates of windthrow around openings of different sizes.
- To describe the attributes of the windthrow (e.g., decay class, dbh, species, crown class, direction of throw).

Stand Structure, Coarse Woody Debris and Natural Regeneration

Thorough descriptions of the stands are necessary to put the results of the trial in perspective related to previous work.

The objective is:

- To describe stand age, species composition, diameter classes, stems per hectare, dead tree density and coarse woody debris.

Planted Stock

Previous research indicated that seedling response was generally better in the 1.0 hectare openings, although sometimes not significantly better than the 0.1-hectare openings. Mount Tom will provide a range of shapes and sizes between the 0.1- and 1.0-hectare sizes where regeneration can be tested and compared to a small 3-hectare clearcut. A mechanical mounding treatment will also be compared to planting in the most optimal microsites found in the previous trial.

The objectives are:

- To compare seedling response between silvicultural treatments: micro-site planting on raised sites and around stumps, planting on excavator mounds and planting around the advanced regeneration left in clumps.
- To compare seedling response to opening size.
- To compare seedling response to the location within the opening.
- To compare seedling response across the ecological conditions found on Mount Tom.
- To monitor advanced regeneration left in clumps.

Vegetation

The effects of vegetation competition on tree seedlings can be a concern in these forests, although vegetation growth is not as aggressive as in warmer subzones. Overall vegetation response, as well as its affect on seedlings at a variety of locations within the openings, will be studied.

The objectives are:

- To monitor the response of vegetation over a range of opening sizes (0.1- to 1.0-hectare).
- To monitor the competitive effect of vegetation on different silviculture treatments across openings of different sizes.

Snow Accumulation and Melt

Forests in the ESSF play an important role in regional hydrology due to high snowfall and the effect of trees on snow accumulation and melt. However, we do not have a good understanding of how the widespread use of a particular silvicultural system will affect accumulation and melting of snow.

The objectives are:

- To document peak snow accumulation and snow melt rates on north- and south-facing slopes for three years before logging and three years after logging.
- To characterize optical density of the canopy and basal area in the plots before and after logging.
- To determine the effects of group selection on peak snow accumulation and snow melt rates on the north- and south-aspect plots.

Photo by Harold Armleder

A typical opening in CP 550-1

Key Contacts:

Harold Armleder, R.P.F., R.P.Bio.
Wildlife Habitat Ecologist
Ministry of Forests
(250) 398-4407
Harold.Armleder@gems6.gov.bc.ca
Role: project co-ordination, caribou-habitat assessments

Michaela Waterhouse, R.P.F., R.P.Bio.
Silvicultural System Researcher
Ministry of Forests
(250) 398-4405
Michaela.Waterhouse@gems4.gov.bc.ca
Role: silvicultural system research co-ordination

Teresa Newsome, R.P.F.
Research Silviculturalist
Ministry of Forests
(250) 398-4408
Teresa.Newsome@gems8.gov.bc.ca
Role: silvicultural research

Pat Teti, P. Geo.
Hydrologist
Ministry of Forests
(250) 398-4752
Pat.Teti@gems7.gov.bc.ca
Role: snow accumulation and melt

Ken Soneff, P.Eng.
Research Section Head
Ministry of Forests
(250) 398-4387
Ken.Soneff@gems7.gov.bc.ca
Role: budget and extension co-ordination

Larry Gardner, R.P.F.
Forestry Supervisor, Planning
West Fraser Mills Ltd.
(250) 992-9244
lgard@westfrasertimber.ca
Role: coordinating West Fraser Ltd. involvement including logging and silviculture

Peter Andrews, R.P.F.
Weldwood of Canada Ltd.
(250) 992-5511
Forestry Coordinator
Peter_Andrews@weldwood.com
Role: coordinating Weldwood Ltd. involvement including logging and silviculture

Jim Young
Wildlife Biologist
Ministry of Water, Land and Air Protection
(250) 398-4564
Jim.Young@gems8.gov.bc.ca
Role: caribou response

Cariboo Forest Region
Research Section
(250) 398-4345

Ministry of Forests
Quesnel Forest District
(250) 992-4400

West Fraser Mills Ltd.
Quesnel Division

Weldwood of Canada Ltd.
Quesnel Operations

Ministry of Water, Land and Air Protection
Cariboo Region
(250) 398-4530

FOREST RENEWAL BC